

AMENDMENTS TO THE SPECIFICATION:

Please replace the amended paragraph beginning at page 5, line 20, as previously presented in the Amendment filed July 6, 2009, with the following rewritten paragraph:

--In addition:

- a. Said water soluble phosphate may consist of a water soluble, phosphate containing phase, alkali phosphates e.g. For the bonding system especially, the content of phosphate is suitably high, preferably 1-90 %, more preferred 5-60 % and even more preferred 10-30 %.  
Effect: an increase of the phosphate content in the material will result in an increased content of apatite (not only limited to the phosphate content of the solution).
- b. The material may comprise grains of phosphate-containing phase, preferably hydroxyapatite and fluoride-apatite,  
Effect: controlling the precipitation of apatite.
- c. The material may comprise additives of collagen, elastin or other high-molecular proteins that are coated in-situ or are pre-coated by apatite from a saturated solution.  
Effect: to control the deposition of apatite.
- d. The material may comprise an additive of a fluoride-containing phase of non difficultly soluble character, fluoride-containing glass (glass ionomer glass) e.g. of non difficultly soluble character, at contents below 10 %.

Other examples of fluoride-containing phase are calcium fluoride ( $\text{CaF}_2$ ) or sodium fluoride ( $\text{NaF}$ ).  
Effect: a way of introducing fluoride in the material, whereby fluoride-apatite can be formed.

e. In the bonding system, the binder phase suitably has a larger mole content of calcium than of aluminium, in which case the binder phase preferably comprises or essentially consists of  $3\text{CaO} \cdot \text{Al}_2\text{O}_3$  (C3A). Accordingly, the ceramic powder is preferably modified for an increased Ca-content in aluminate (the C<sub>3</sub>A-CA-system). If using C3A or some other phase that is rich in calcium, more calcium is obtained that can react with ~~phosphor~~phosphorous to form apatite. In addition, C3A hardens fast which is good in a thin layer that is to be applied onto the tooth/bone before the filling takes place.

f. The material may comprise carbonate or biologically existing ions that may form: oxalates, lactates, calcite, aragonite. That is, the carbonate or biologically existing ions has the capacity to form calcite and/or aragonite, oxalates, lactates, citrates. Carbonate ions may for example form calcite and calcium may form difficultly soluble biological salts with the anion of the lactic acid, lactate etc.

Effect: by controlling the concentration and the composition of the ions, different biological phases

containing Ca may be deposited. This also applies to water-soluble additives in the powder raw material.

- g. The addition of water-soluble phosphate may be achieved by addition of a phase that forms phosphate ions during hydration ( $P_2O_5$ , active glass containing ~~phosphor~~phosphorous, bioglass, Apatite-Wollastonite glass e.g.). Additives of elements that deliver phosphate in water, such as tricalcium phosphate, alkali salts, are also included in the concept of "addition of water-soluble phosphate".
- h. It is also possible to supply ~~phosphor~~phosphorous by pre-coating particles (filler or cement) with phosphate or ~~phosphor~~phosphorous. Such a pre-coating may easily be performed by dissolving crystals of phosphoric acid e.g. in an inert solvent, isopropanol e.g. Fillers and cement particles are then mixed in the isopropanol, where after the isopropanol is driven off and ~~phosphate/phosphor~~phosphate/phosphorous remains on the particles.
- i. It is also possible to form solid solutions of cement phase (calcium silicates or calcium aluminates) and ~~phosphor~~phosphorous, according to the principles described in SE-A0-0103189-7. The concentration of ~~phosphor~~phosphorous that is possible to dissolve in the cement is < 10 % by atoms, preferably < 5 % by atoms.

- j. Also other apatites than hydroxyapatite and that function well in the body, can be included in the concept of "apatite" and may in the present text also be included in the concept of "hydroxyapatite", chloride-apatite, carbonate apatite, fluoride-apatite and magnesium apatite e.g. Chloride-apatite may easily be formed by dissolving chloride in the hydration liquid or alternatively by incorporating a readily soluble salt in the material. Carbonate apatite may be formed by hydrating in carbonated phosphoric acid. Fluoride-apatite may be formed by addition of fluoride, in the form of LiF e.g. as an accelerator and magnesium apatite may be formed by precipitation reaction at the forming of apatite with Mg in the aqueous solution.
- k. For dental filling or implant materials, the powdered material may take the form of a raw compact that preferably exhibits a degree of compaction of at least 55 % by volume solid phase, more preferred at least 60 % by volume solid phase, even more preferred at least 65 % by volume solid phase and most preferred of all at least 70 % by volume solid phase.
- l. As an alternative, the powdered material may exist in loose powder form, in which case it is mixed with the hydration liquid to form a suspension that is subsequently drained and compacted.--

Please replace the amended paragraph beginning at page 8, line 9, as previously presented in the Amendment filed July 6, 2009, with the following rewritten paragraph:

-- The hydration liquid consists of an aqueous liquid that according to the invention comprises water soluble phosphate or a phase that forms phosphate ions during hydration, whereby the cement system exhibits the capacity during hydration to form apatite. The water soluble phosphate comprises phosphate ions in the group that consists of  $\text{PO}_4^{3-}$ ,  $\text{HPO}_4^{2-}$ ,  $\text{H}_2\text{PO}_4^-$ , ~~hydro-ammonium phosphate~~ and other ~~phosphor-containing~~ phosphorous-containing ions, or the water soluble phosphate is hydro-ammonium phosphate.--

Please replace the amended paragraph beginning at page 8, line 14, as previously presented in the Amendment filed July 6, 2009, with the following rewritten paragraph:

--In addition:

- a) Said water soluble phosphate forms phosphate ions in the liquid, preferably  $\text{PO}_4^{3-}$ ,  $\text{HPO}_4^{2-}$ ,  $\text{H}_2\text{PO}_4^-$  or some other ~~phosphor-containing~~ phosphorous-containing ion.
- b) The liquid may also be a bonding liquid, that is applied on bone or tooth before the dental filling material/implant material with additional (free from phosphate or phosphate-containing) hydration liquid is applied, in which case water soluble phosphate in the

bonding liquid forms apatite with the dental filling material/implant material.

- c) The liquid may comprise carbonate or biologically existing ions that may form: oxalates, lactates, calcite, aragonite. That is, the carbonate or biologically existing ions has the capacity to form calcite and/or aragonite, oxalates, lactates, citrates. Carbonate ions may for example form calcite and calcium may form difficultly soluble biological salts with the anion of the lactic acid, lactate etc. Effect: by controlling the concentration and the composition of the ions, different biological phases containing Ca may be deposited.
- d) The concentration of phosphate ions should be 0.01-5 M, preferably 0.1-2 M and most preferred 0.5-1.5 M. Specifically for the bonding system, the preferred concentrations are even higher, namely 0.01-5 M, preferably 0.5-4 M, most preferred 1-3 M. Suitably, phosphate ions exist in concentrations close to saturation in the bonding liquid or the liquid for the bonding system. By using very high concentrations, an increased deposition of apatite may be obtained in the zone between the tooth/bone and the material. Effect: A high concentration will give more apatite phase.

- e) The hydration liquid pH should be adjusted to at least 7, preferably 7-12.5 and even more preferred 7-11, preferably by use of a buffering system of phosphates or carbonates, e.g.

Effect: The pH controls the equilibrium for deposition of apatite and katoite (main phase in the Ca-aluminate-hydrate system). Accordingly, the system pH is also at least 7, preferably 7-12.5 and even more preferred 7-11, preferably by use of a buffering system of phosphates or carbonates e.g.

- f) The liquid may comprise added fluoride ions, to a concentration of fluoride ions in the range of 0.01-5 M, preferably 0.1-2 M, most preferred 0.5-1 M,

Effect: gives a formation of fluoride-apatite, together with katoite. (Fluoride-apatite is even more stable than hydroxyapatite).

- g) The liquid may comprise a suspended or emulsified, non hydrated or partially hydrated calcium aluminate cement, for the formation of a basic environment for the apatite.

- h) The liquid may comprise accelerator and/or superplasticizer.

- i) Chloride-apatite may be formed by dissolving chlorine in the hydration liquid. Carbonate apatite may be

formed by hydrating in carbonated phosphoric acid. Fluoride-apatite may be formed by addition of fluoride, in the form of LiF e.g. as an accelerator and magnesium apatite may be formed by precipitation reaction at the forming of apatite with Mg in the aqueous solution.--